This document contains Part 1 (pp.131–135) of Chapter 5 of the National Coastal Condition Report III.

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National Coastal Condition Report III

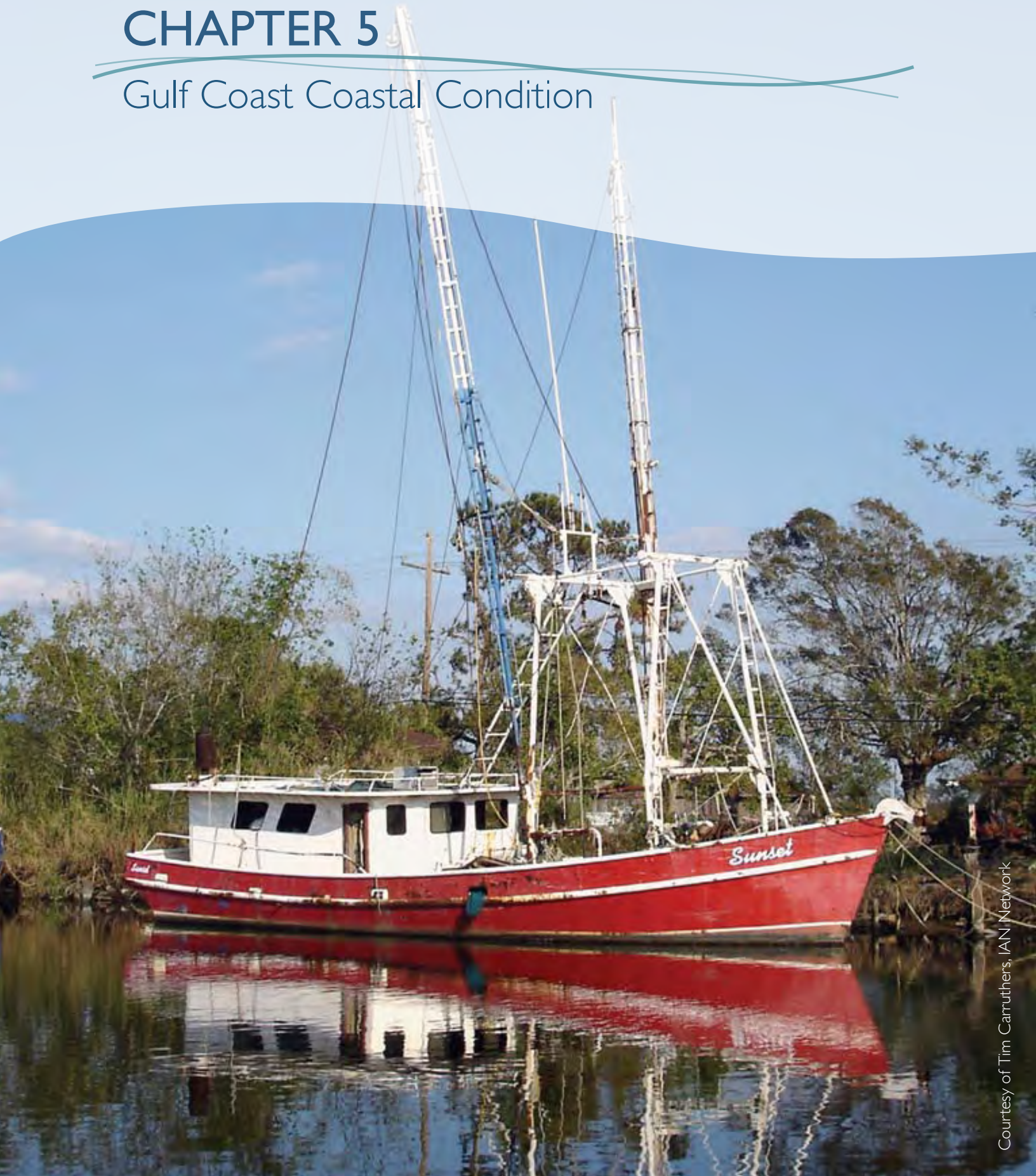
Chapter 5: Gulf Coast Coastal Condition

Part 1 of 3

December 2008

CHAPTER 5

Gulf Coast Coastal Condition



Courtesy of Tim Carruthers, IAN Network

Gulf Coast Coastal Condition

As shown in Figure 5-1, the overall condition of the coastal waters of the Gulf Coast region is rated fair to poor, with an overall condition score of 2.2. The water quality index for the region's coastal waters is rated fair; the sediment quality, benthic, and coastal habitat indices are rated poor; and the fish tissue contaminants index is rated good. Figure 5-2 provides a summary of the percentage of the region's coastal area rated good, fair, poor, or missing for each index and component indicator. This assessment is based on environmental stressor and response data collected by the states of Florida, Alabama, Mississippi, Louisiana, and Texas from 487 locations, ranging from Florida Bay, FL, to Laguna Madre, TX, in 2001 and 2002. Please refer to Chapter 1 for information about how these assessments were made, the criteria used to develop the rating for each index and component indicator, and the limitations of the available data.

The Gulf Coast coastal area comprises more than 750 estuaries, bays, and sub-estuary systems that are associated with larger estuaries. The total area of the Gulf Coast estuaries, bays, and sub-estuaries is 10,643 mi^2. Gulf Coast estuaries and wetlands provide critical feeding, spawning, and nursery habitat for a rich assemblage of fish and wildlife, including essential habitat for shorebirds, colonial nesting birds, and migratory waterfowl. The Gulf Coast is also home to an incredible array of indigenous flora and fauna, including endangered or threatened species such as the Kemp's ridley sea turtle, Gulf sturgeon, Perdido Key beach mouse, West Indian manatee, telephus spurge, and piping plover. This region's coastal waters also support vegetated habitats that stabilize shorelines from erosion, reduce nonpoint-source loadings, and improve water clarity.

The coastal waters of the Gulf Coast region are among the most productive natural systems, and the region is second only to Alaska for domestic landings of commercial fish and shellfish. In 2001 and 2002, commercial fish and shellfish landings from Gulf Coast waters totaled 1.5 million t and were valued at $1.5 billion (NMFS, 2003). The

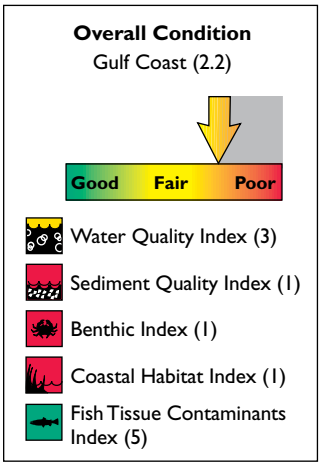


Figure 5-1. The overall condition of Gulf Coast coastal waters is rated fair to poor (U.S. EPA/NCA).

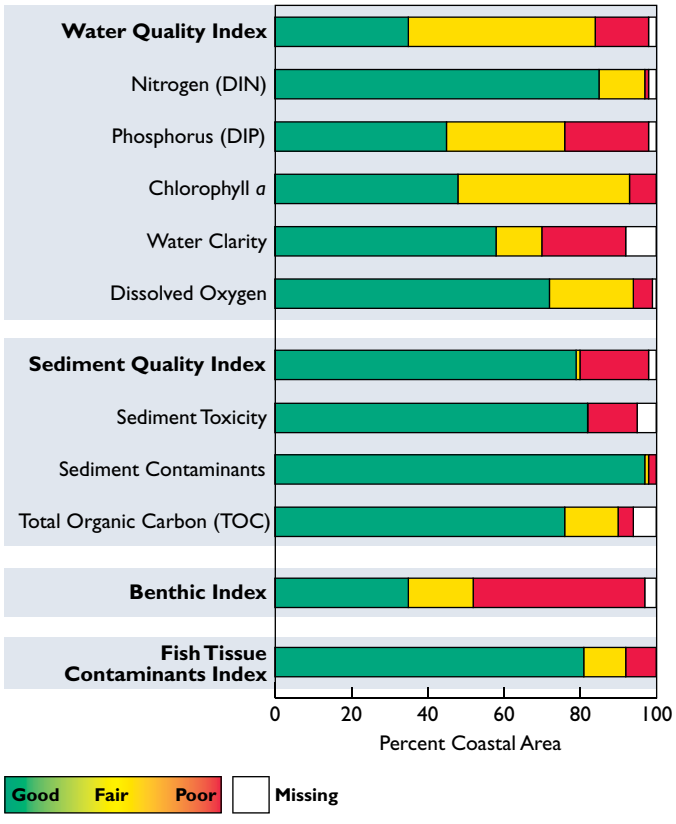


Figure 5-2. Percentage of coastal area achieving each ranking for all indices and components indicators—Gulf Coast region (U.S. EPA/NCA).

Gulf Coast led the United States as the source of commercial shrimp landings in 2004 with 115,566 t, which accounted for 83% of the total U.S. shrimp landings that year (NMFS, 2005c).

Gulf Coast coastal waters are located in two biogeographical provinces: the Louisianian Province and the West Indian Province. The Louisianian Province extends from the Texas–Mexico border east to Anclote Key, FL. The West Indian Province extends from Tampa Bay, FL, on the Gulf Coast to the Indian River Lagoon, FL, on the Atlantic Coast; the portion of this province included in the Gulf Coast region extends from Tampa Bay to Florida Bay. The borders of the Gulf Coast region roughly coincide with the borders of the Gulf of Mexico LME. The estuaries and embayments sampled by NCA in the Gulf Coast region range in size from 0.00946 mi^2 (Bayou Chico, FL) to 1,196 mi^2 (Florida Bay, FL).

The population of coastal counties in the Gulf Coast region increased 45% between 1980 and 2003. Coastal counties in Texas and Florida are leading the region in population change. Figure 5-3 presents population data for Gulf Coast coastal counties and shows the increase in population of these coastal counties since 1980 (Crossett et al., 2004).

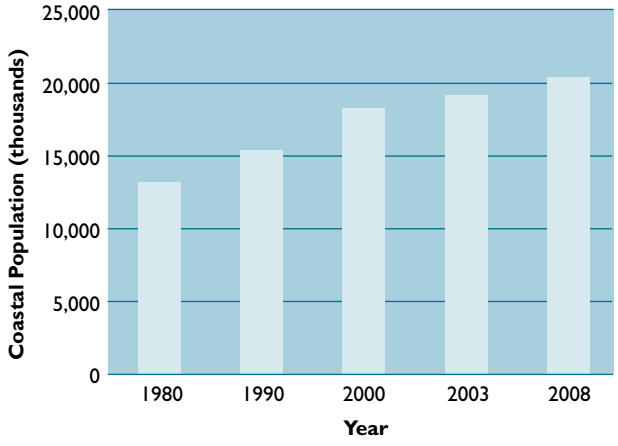


Figure 5-3. Actual and estimated population of coastal counties in Gulf Coast states from 1980 to 2008 (Crossett et al., 2004).

The NCA monitoring data used in this assessment were based on single-day measurements collected at sites throughout the U.S. coastal waters (excluding the Great Lakes) during a 9- to 12-week period in late summer. Data were not collected during other time periods.

Coastal Monitoring Data—Status of Coastal Condition

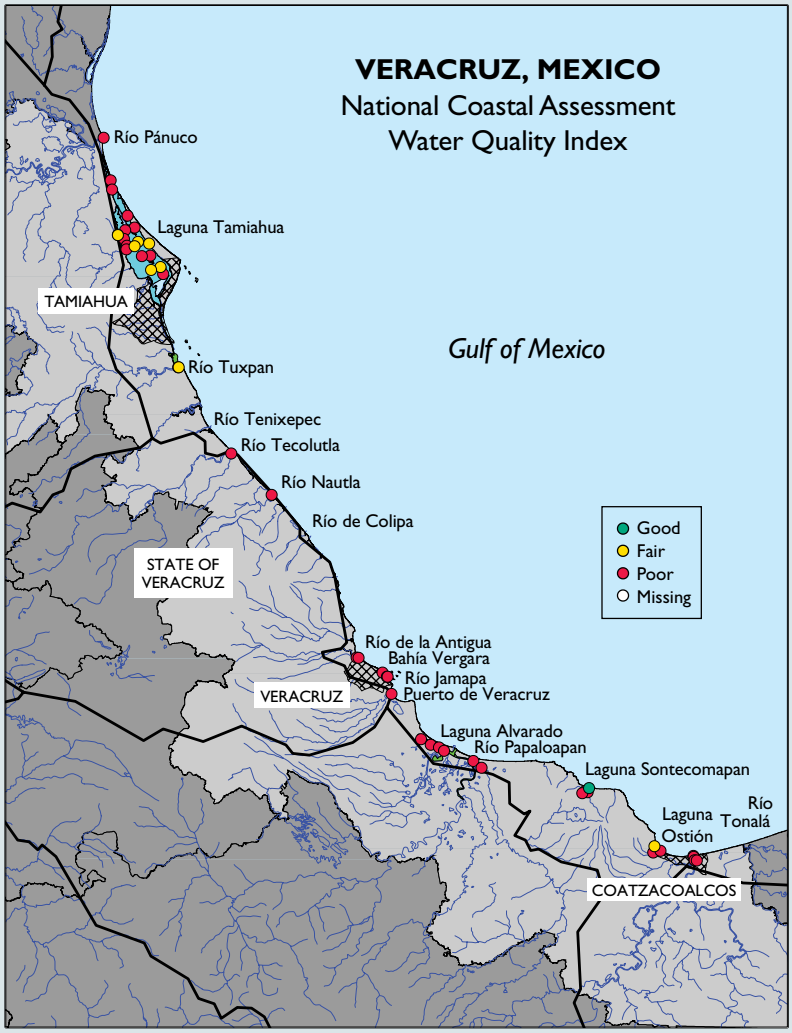
A variety of programs have monitored the coastal waters of the Gulf Coast region since 1991. EMAP focused its coastal monitoring efforts on Gulf Coast coastal waters from 1991 to 1995 (Macauley et al., 1999; U.S. EPA, 1999). The Joint Gulf States Comprehensive Monitoring Program (GMP) began an assessment in 2000, in conjunction with EPA's Coastal 2000 Program (U.S. EPA, 2000b). This partnership has continued as part of the NCA, with coastal monitoring being conducted by the five Gulf Coast states through 2004. In addition, NOAA's NS&T Program has collected contaminant bioavailability and sediment toxicity data from several Gulf Coast sites since the late 1980s (Long et al., 1996). Data from the NS&T Program Bioeffects Project are available at http://www.nos.noaa.gov/cit/nsandt/download/bi_download.aspx.

The sampling conducted in the EPA NCA survey has been designed to estimate the percent of coastal area (nationally or in a region) in varying conditions and is displayed as pie diagrams. Many of the figures in this report illustrate environmental measurements made at specific locations (colored dots on maps); however, these dots (color) represent the value of the index specifically at the time of sampling. Additional sampling would be required to define temporal variability and to confirm environmental condition at specific locations.

Highlight

Assessing the Ecological Condition of the Coastal Waters of Veracruz, Mexico

The influence of stressors, either natural or anthropogenic, on the coastal waters of the Gulf of Mexico does not abate across political boundaries. To fully understand the ecological condition of Gulf of Mexico coastal waters, the entire coastline needs to be assessed, including waters in both the United States and Mexico. In May 2002, the EPA undertook an international technology transfer activity with the Mexican State of Veracruz to transfer information about the NCA survey methodologies and to assist the State in collecting information to assess the condition of its Gulf of Mexico coastal waters. During the summer of 2002, representatives from EPA trained and assisted Mexican biologists in the application and implementation of the NCA probability-based survey design. Data were collected to support some of the same indices and component indicators as those collected by NCA for the U.S. Gulf Coast region so that comparisons between the ecological indicators of these two areas could be made.



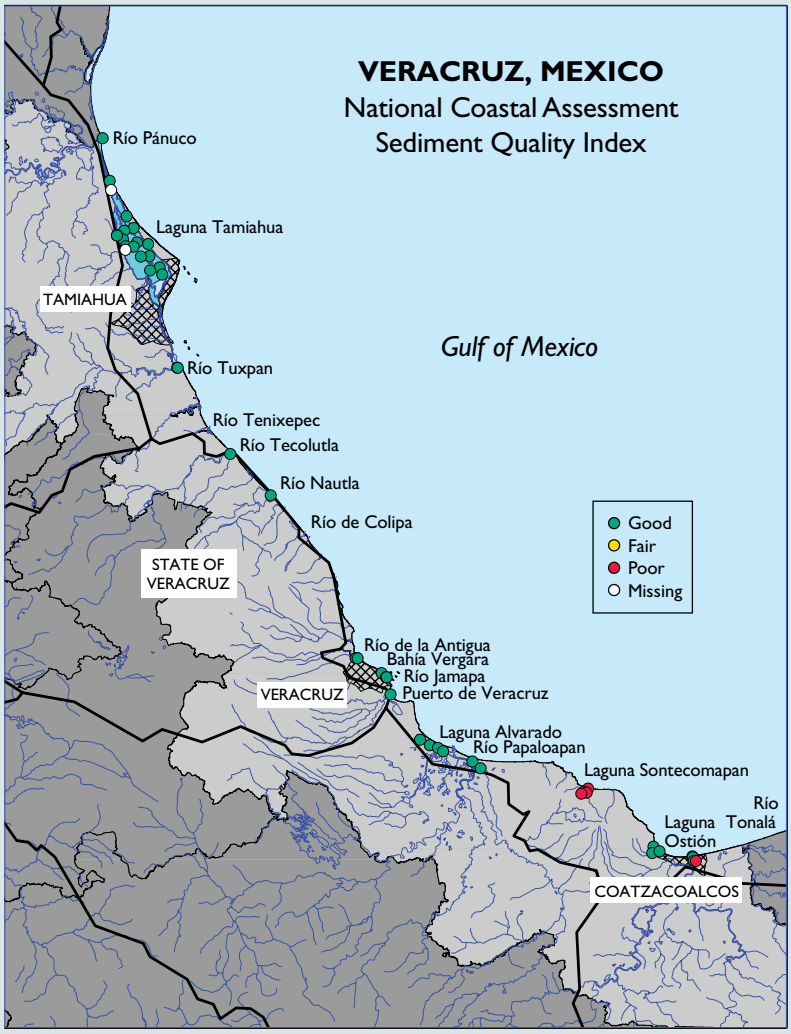
Water quality index data for Gulf of Mexico coastal waters of Veracruz, Mexico (U.S. EPA/NCA).

The joint U.S./Mexico team sampled 50 probability-based stations over a 3-week period. The samples were split between EPA and the Officina de Subsecrataria de Medio Ambiente Gobierno del Estado de Veracruz. The water quality and sediment quality indices were calculated using the data collected during the survey (Macauley et al., 2007).

The water quality index was rated poor for 75% of the coastal area sampled in Veracruz, rated fair for 24%, and good for 1% (see map). Poor water clarity, high levels of chlorophyll *a*, and elevated concentrations of DIP and DIN contributed to the poor water quality ratings. Poor water quality was

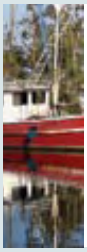
spread uniformly throughout the coastal waters. Inadequate treatment of sewage and municipal runoff are the candidate sources for these elevated levels (Macauley et al., 2007).

In contrast to the water quality index, only 1% of the Veracruz coastal area had poor sediment quality, primarily as a result of sediment contamination (see map). Sampled sediments were rated poor primarily due to exceedances of the ERL level for a variety of chemical contaminants, including PAHs, mercury, cadmium, chromium, copper, arsenic, silver, and zinc. The sediment toxicity and sediment TOC component indicators made only minor contributions to the poor rating of the sediment quality. Industry is concentrated around ports in the southern portion of Veracruz. The elevated concentrations of PAHs and metals contributing to poor sediment quality were detected only in southern ports, such as Laguna Sontecomapan and Laguna Ostión, which support petrochemical and pharmaceutical industries (Macauley et al., 2007).



Sediment quality index data for Gulf of Mexico coastal waters of Veracruz, Mexico (U.S. EPA/NCA).

The inclusion of the Mexican State of Veracruz in the assessment of coastal waters represents a significant step towards assessing coastal condition throughout the Gulf of Mexico. Discussions are underway with the Mexican government to include other Gulf Coast Mexican states in this ecological monitoring program (Macauley et al., 2007).



Guidelines for Assessing Sediment Contamination (Long et al., 1995)

ERM (Effects Range Median)—Determined values for each chemical as the 50th percentile (median) in a database of ascending concentrations associated with adverse biological effects.

ERL (Effects Range Low)—Determined values for each chemical as the 10th percentile in a database of ascending concentrations associated with adverse biological effects.